

Application No. 09/902,170
Reply to Office Action of November 14, 2005

Docket No.: A8319.0058/P058

REMARKS

The application has been reviewed in light of the Office Action mailed on December 14, 2005. Claims 1, 3, 5, 8, 13, 20, 24, 31, 50, 57, 62, 69, 73 and 80 have been amended without adding new matter. Claims 4, 6, 9, 11, 12, 16, 18, 21, 23, 27, 29, 32, 34, 53, 55, 58, 60, 61, 65, 67, 70, 72, 76, 78, 81 and 83 have been cancelled without prejudice. Claims 1-3, 5, 7, 8, 13-15, 17, 19, 20, 24-26, 28, 30, 31, 50-52, 54, 56, 57, 62-64, 66, 68, 69, 73-75, 77, 79 and 80 are now pending in the application. Reconsideration of the pending claims is respectfully requested.

Claims 1-8, 13-20, 24-31, 50-57, 62-69 and 73-80 stand rejected under 35 U.S.C. § 103 as being unpatentable over Applicants' admitted prior art (AAPA) in view of Tsujimura et al., U.S. Patent No. 6,391,691 ("Tsujimura"). Reconsideration is respectfully requested in light of the foregoing amendments and the following remarks.

Claim 1 recites a method comprising "removing ... impurity from said channel region and diffusing said impurity into said contact portion to form a contact layer within said amorphous silicon layer." Claim 1 has been amended to recite that "in a sectional view said channel region in said amorphous silicon layer is convex with respect to said contact layer." This feature of the invention is described, for example, on pages 14-15 and associated Figures of the specification, which discloses that "the channel portion of the high resistance amorphous silicon film 4 ... has a cross sectional shape convexed to the contact layer 6." Specification, page 14, line 19 – page 15, line 3. The claimed invention is not limited to the disclosed embodiments.

This feature of the present invention is directed to a fabrication method, of Fig. 1 for example, comprising the steps of:

forming an impurity (5) on a surface of an amorphous silicon layer (4);

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forming thereon a drain electrode and a source electrode separated by a channel portion to form a channel region, which is convex-type in a sectional view; and

removing said impurity (5) from said surface of said amorphous silicon layer (4) on which neither said drain electrode nor said source electrode is formed.

As described above, in the present invention a convex-type channel region is formed in a sectional view. Namely, since the fabrication process is implemented without the etching process, even if the thickness of the amorphous silicon layer is thinner than that of the prior art, the remarkable effect for realizing the stable and uniform characteristics of the Thin Film Transistor (TFT) can be attained. See, for example, page 15, lines 17-19 of the specification.

The AAPA and Tsujimura, whether taken alone or in combination, fail to teach or suggest that "in a sectional view said channel region in said amorphous silicon layer is convex with respect to said contact layer," as recited in amended claim 1. The AAPA does not teach or suggest this limitation. Tsujimura discloses a top gate type TFT in which the channel portion is concave in a sectional view. As such, it is more difficult to fabricate the contact according to the disclosure of Tsujimura as compared with the present invention. In Tsujimura, the remarkable effect for realizing the stable and uniform characteristics of the TFT can not be attained.

Accordingly, even if the references are combined, one of the characteristic constitutions of the present invention cannot be realized. Unlike the present invention, if the thickness of the amorphous silicon layer is thinner than that of the prior art in the simple fabrication process, the remarkable effect of achieving stable and uniform characteristics of the TFT can not be attained by the combination of the references.

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For at least this reason, amended claim 1 is allowable. Claims 2, 3, 5, 7 and 8 depend from claim 1 and should be allowed for at least the same reasons claim 1 is allowable, and for other reasons. Claims 4 and 6 have been cancelled.

Independent claims 13, 24, 50, 62 and 73 have been amended to recite that "in a sectional view said channel region in said amorphous silicon layer is convex with respect to said contact layer." As discussed above with respect to claim 1, the references, whether taken alone or in combination, fail to teach or suggest this claim limitation. Claims 13, 24, 50, 62 and 73 are allowable for at least this reason. Claims 14, 15, 17, 19 and 20 depend from claim 13; claims 25, 26, 28, 30 and 31 depend from claim 24; claims 51, 52, 54, 56 and 57 depend from claim 50; claims 63, 64, 66, 68 and 69 depend from claim 62; and claims 74, 75, 77, 79 and 80 depend from claim 73. These dependent claims incorporate every limitation of their base claims, and should be allowed together with their base claims. Claims 16, 18, 27, 29, 53, 55, 65, 67, 76 and 78 have been cancelled.

Claims 9, 11-13, 21, 23, 24, 32, 34, 58, 60-62, 70, 72, 73, 81 and 83 stand rejected under 35 U.S.C. § 103 as being unpatentable over AAPA in view of Tsujimura as applied to claims 1-8, 13-20, 24-31, 50-57, 62-69 and 73-80 above, and further in view of Washizuka et al., (IDW 1997 pp. 207-210) ("Washizuka"). Reconsideration is respectfully requested.

The rejection is predicated upon the rejection over AAPA in view of Tsujimura. As discussed above, independent claims 1, 13, 24, 50, 62 and 73 have been amended and are allowable over the proposed combination of AAPA in view of Tsujimura. Washizuka adds nothing to remedy the deficiencies of AAPA and Tsujimura with respect to claims 1, 13, 24, 50, 62 and 73. For example, Washizuka (Fig.

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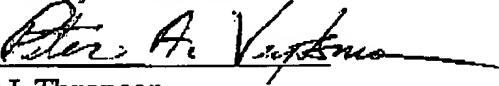
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3) discloses that not only the impurity but also the amorphous silicon layer is eliminated by using the etching process to make the channel portion a concave type.

Thus, claims 13, 24, 62, 73, 81 and 83 are allowable over the proposed combination AAPA in view of Tsujimura and further in view of Washizuka. Claims 9, 11, 12, 21, 23, 32, 34, 58, 60, 61, 70, 72, 81 and 83 have been cancelled. In view of the above amendments and remarks, Applicants believe the pending application is in condition for allowance.

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Respectfully submitted,

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